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Deaths among women of reproductive age: A forensic autopsy study

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ABSTRACT

Unnatural deaths in women of reproductive age (range 12–49 years) have a serious psychological and social impact on the family and community. Deaths among women of reproductive age reported as medico-legal cases were investigated to see the trend in terms of cause and manner of death. The study group consisted of a series of 328 consecutive forensic autopsies on women in the reproductive age group, performed between 2009 and 2011 at the Government Wenlock District Hospital, Mangalore, India by qualified specialist forensic medicine experts. Unnatural deaths formed 93.6% of the cohort. The top three causes of death included burns, poisoning and hanging forming 69.5% of the cases. The manner of death was suicide in 45.4% cases, accident in 43.6% cases and homicide in 4.6% cases. The circumstances of death were related to alleged medical negligence in 2.4% cases. Death in 4% cases was natural mannered with a disease being the cause of death. Three-fourths of the victims were married. Married women formed 63.1% of the suicidal victims. Homicidal deaths were not reported among unmarried women. The preponderant method of suicide was by poisoning at 42.3% (63 cases), followed by hanging (34.9%), burns (11.4%) and drowning (9.4%). These four methods comprised 98% of the total suicidal deaths in this study cohort. Accidental deaths were predominantly caused by burns (62.2%) and road traffic accident (23.1%). Two-thirds of the homicidal deaths were due to assault caused by blunt-force trauma, ligature strangulation and sharp-force trauma. One-third of the homicidal victims died due to burns. With a clear understanding of the cause and manner of death, it may be possible to predict, and hopefully prevent, future cases of unnatural deaths in women of reproductive age who form a very important group of society.

1. Introduction

Women in the reproductive age group (range 12–49 years)[1] comprise a vulnerable section of our society as they are confronted with menstrual and pregnancy-related stress factors in addition to the stressors prevalent in the general population.[2] Moreover, unnatural deaths in women of reproductive age indirectly have a serious psychological and social impact on the family and community. Deaths among women of reproductive age reported for forensic (medico-legal) autopsies were investigated to identify the cause and manner of such deaths in the coastal city of Mangalore in the southwestern region of India.

2. Material and methods

The study group consisted of a series of 328 consecutive medico-legal autopsies on women in the reproductive age group, performed from January 2009 to December 2011 at the Government Wenlock District Hospital, Mangalore by the faculty of the Department of Forensic Medicine, Kasturba Medical College, Mangalore, India. The criteria for exclusion were age younger than 12 years or older than 49 years, death of unknown women and victims of an air-crash disaster that occurred in 2010. The medico-legal autopsy case records and inquest records furnished by the police or magistrate for the 3-year reference period were individually reviewed in March 2012 for relevant information on demographics, cause of death and manner of death. Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS), version 16, statistical analysis program (SPSS, Inc., Chicago, IL, USA).

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3. Results

During the 3-year reference period a total of 2222 forensic autopsies, with 1748 males (78.7%) and 474 females (21.3%) resulting in a male to female ratio of 3.7:1, were performed at the aforementioned centre with the exclusion of the postmortem examination of the victims of an air-crash disaster that occurred in 2010.[3] The aforementioned centre caters to nearly 90% of the forensic autopsies in Mangalore city.[4] A total of 328 deaths were identified as those among females in the reproductive age group forming the cohort of the present study, representing 14.8% of the total autopsies performed and 69.2% of the female autopsies performed. The total number of deaths among women in the reproductive age group increased from 98 (30%) in 2009 to 124 (37.8%) in 2011. The mean (± standard deviation (SD)) age of the cohort was 30.15 (9.28) years with the age ranging from 12 to 48 years; 46 (14%) were adolescents. A 10-year age-range distribution thereafter showed 126 (38.4%) cases in the third decade followed by 93 (28.4%) cases in the fourth decade and 63 (19.2%) cases in the fifth decade. The marital status of the 328 victims revealed that 80 (24.4%) were unmarried and 248 (75.6%) were married. There were no divorced or widowed women or women married more than once. The year-wise distribution of married victims showed an increasing trend from 67 (27%) in 2009 to 96 (38.7%) in 2011. Marital status by age showed that only two (0.8%) adolescent victims were married. The youngest married victim was aged 19 years. The eldest unmarried victim was aged 42 years.

The top three causes of death were burns in 111 (33.8%) victims followed by poisoning in 65 (19.8%) and hanging in 52 (15.9%) victims (Table 1). The fatal poisoning cases were due to consumption of agriculture-related poisons (insecticides, rodenticides, weed killers and fungicides) and medications (benzodiazepines and barbiturates). Seven cases of maternal causes of death and a case of surgical cause of death formed the alleged medical negligence cases. Natural causes of death included pulmonary tuberculosis (four cases), pneumonia (four cases) and a case each of subarachnoid haemorrhage, rheumatic heart disease, atherosclerotic coronary artery disease, acute myeloid leukaemia and acute respiratory distress syndrome (ARDS) due to sepsis.

Unnatural deaths formed 93.6% of the cohort. The manner of death was suicide in 149 (45.4%) cases, accident in 143 (43.6%) cases and homicide in 15 (4.6%) cases (Fig. 1). The circumstances of death were related to alleged medical negligence in eight (2.4%) cases. Death in 13 (4%) cases was natural-mannered with a disease being the cause of death. Manner of death distribution by age showed

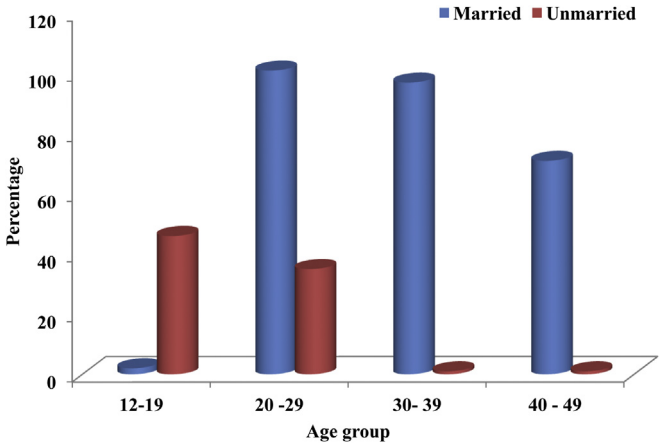

Fig. 1. Marital status distribution by age range of reproductive age group women.

Table 1
Distribution of cause of death in the study cohort.

Cause of death	Number	Percent
Burns	111	33.8
Poisoning	65	19.8
Hanging	52	15.9
Road traffic accident	33	10.1
Drowning	18	5.5
Fall/jump from a height	10	3.0
Assault	10	3.0
Natural causes	13	4.0
Maternal causes of alleged medical negligence	7	2.1
Railway accident	4	1.2
Surgical causes of alleged medical negligence	1	0.3
Snake bite	1	0.3
Elephant stampede	1	0.3
Firearm injury	1	0.3
Accidental strangulation	1	0.3
Total	328	100

that 67 (45%) cases of suicides were among reproductive age-group women in the third decade (Table 2). Twenty-eight (18.8%) suicidal victims were adolescents. Two-thirds of the accidental victims were in the third and fourth decades. Nearly 75% of the homicidal victims were in the third and fourth decades. Homicidal deaths were not reported among adolescents. Manner of death distribution by marital status showed that 94 (63.1%) of the suicidal victims were married and 55 (36.9%) of the suicidal victims were unmarried (Table 3). Deaths by homicide were not reported among unmarried women.

The preponderant method of suicide was by poisoning at 42.3% (63 cases), followed by hanging (34.9%), burns (11.4%) and drowning (9.4%). These four methods comprised 98% of the total suicidal deaths in this study cohort. The less common methods of suicide were by jumping from a height and firearm injury (Table 4). Accidental deaths were predominantly by burns at 62.2% (89 cases), followed by road traffic accident (23.1%) and fall from a height (5.6%). The circumstances of accidental burns were domestic related either due to contact with kerosene lamps or firewood while cooking food in the kitchen and due to a kerosene stove bursting. The less common causes of accident were by drowning, railway accident, poisoning, snake bite, elephant stampede and strangulation (Table 5). Two-thirds of the homicidal deaths were due to assault including four cases of blunt-force trauma, four cases of ligature strangulation and two cases of sharp-force trauma. One-third of the homicidal victims died due to burns.

4. Discussion

Death among women of reproductive age has a marked effect on resources and management outcomes in the family and community. An epidemiological assessment of causes of death among women of reproductive age is needed for increased awareness of health problems in this population group, allocating public-health resources and appropriately developing strategies for prevention.[5] Further, the age, gender and aetiology distribution of death differs among different populations under study and changes over time. Hence, inferring results of data from a national or regional registry to a particular population may be imprecise. The present study primarily aimed at providing a representative epidemiological assessment of the entire geographic location under study. As Government Wenlock District Hospital caters to nearly 90% of the medico-legal autopsies in Mangalore city,[3] the data sample provides a fair idea of existing situation in this region.

The year-wise distribution of deaths in women of reproductive age shows an increasing trend from 2009 through 2011. The leading

Table 2
Manner of death distribution by age range of reproductive age group women.

			Manner of death					Total
			Suicide	Accident	Homicide	Alleged medical negligence	Natural death	
Age range (years)	12–19	Number	28	17	0	0	1	46
		Percent	18.8%	11.9%	0.0%	0.0%	7.7%	14%
	20–29	Number	67	47	5	4	3	126
		Percent	45.0%	32.9%	33.3%	50.0%	23.1%	38.4%
	30–39	Number	30	48	6	4	5	93
		Percent	20.1%	33.6%	40.0%	50.0%	38.5%	28.5%
	40–49	Number	24	31	4	0	4	63
		Percent	16.1%	21.7%	26.7%	0.0%	30.8%	19.2%
Total		Number	149	143	15	8	13	328
		Percent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3
Manner of death distribution by marital status of reproductive age group women.

			Manner of death					Total
			Suicide	Accident	Homicide	Alleged medical negligence	Natural death	
Marital status	Married	Number	94	120	15	7	12	248
		Percent	63.1%	83.9%	100.0%	87.5%	92.3%	75.6%
	Unmarried	Number	55	23	0	1	1	80
		Percent	36.9%	16.1%	0.0%	12.5%	7.7%	24.4%
Total		Number	149	143	15	8	13	328
		Percent	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4
Distribution of suicidal deaths by method/cause of death.

Cause of death	Number	Percent
Poisoning	63	42.3
Hanging	52	34.9
Burns	17	11.4
Drowning	14	9.4
Jump from a height	2	1.3
Firearm injury	1	0.7
Total	149	100

Table 5
Distribution of accidental causes of death.

Cause of death	Number	Percent
Burns	89	62.2
Road traffic accident	33	23.1
Fall from a height	8	5.6
Drowning	4	2.8
Railway accident	4	2.8
Poisoning	2	1.4
Snake bite	1	0.7
Elephant stampede	1	0.7
Accidental strangulation	1	0.7
Total	143	100

causes of unnatural death in this region in descending order of frequency were burns, poisoning, hanging, road traffic accident and drowning. The causes of natural death were not commonly observed as the present study was forensic (medico-legal) autopsy based and in natural deaths a medico-legal autopsy is not routinely conducted unless death is sudden and unexpected or unwitnessed and suspicious.[6–8] Such cases where the manner of death was determined as natural were uncommon forming <5% of the cohort and included pulmonary tuberculosis, pneumonia, subarachnoid haemorrhage, rheumatic heart disease, atherosclerotic coronary artery disease, acute myeloid leukaemia and ARDS due to sepsis. Although relatively rare alleged medical negligence and railway accidents were still investigated as causes of death.

Another key finding of the study is the manner of death among the reproductive-age-group women. The most common manner of death in the study group was suicide followed by accident. Homicide was relatively less common. This finding implicates that the potential strategies for improving the overall health of women in this region must focus on understanding and addressing the suicidal behaviour and safety education for prevention of accidents. Identification of at-risk individuals, teaching stressor coping strategies, suicide prevention campaigns and promoting the accurate representation of suicidal actions in the media are some of the recommended strategies for suicide prevention.[9] Programmes for promoting safer practices through public education may be a helpful accident prevention strategy. Poisoning, hanging, burns and drowning constituted the major methods of suicide. Interestingly, the analysis of marital influence on distribution of manner of death showed that suicidal victims were common in both married and unmarried but homicides were virtually non-existent in unmarried women.

The present study has a few limitations. First, although the data speaks strongly for the population of the city, the external validity of these findings to the surrounding catchment areas may not be as accurate. Further, we have not done a socioeconomic stratification considering the manner and cause of death. Similarly, pregnancy-related deaths and dowry[10,11] related deaths need special mention and have not been categorised into a separate group in our study. Nonetheless, the large and representative nature of the sample and use of forensic autopsies as opposed to verbal autopsies to determine the manner and cause of death were the major strengths of this study. With a clear understanding of the cause and manner of death, it may be possible to predict, and hopefully prevent, future cases of unnatural deaths in women of reproductive age who form a very important group of society. We hope that the findings of this study will aid in formulation of more focussed efforts and strategies for the prevention of death among reproductive-age-group women in this region. We recommend

future research on pregnancy-related deaths due to injury and violence and dowry related deaths in the Mangalore city region of India.

Ethical approval

Not required.

Funding

None.

Contributions

JRP composed the data and is the guarantor. RGM and SP conceived and designed the study. SBS statistically analysed the data. RGM wrote the first draft of the manuscript. SP and SBS researched the literature and interpreted the findings. JPR, SP and SBS critically revised the manuscript for intellectual content. All the authors reviewed and approved the final draft of the manuscript.

Conflict of interest

The authors have no financial and non-financial conflicts of interest to be declared.

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